Spring 2018

Microbiology (SGSC)

Molly Smith
South Georgia State College, molly.smith@sgsc.edu

Sara Selby
South Georgia State College, sara.selby@sgsc.edu

Grants Collection
South Georgia State College

UNIVERSITY SYSTEM OF GEORGIA

Molly Smith and Sara Selby

Microbiology

Affordable Learning Georgia

Georgia's Virtual Library GALILEO
An Initiative of the University System of Georgia

Grants Collection

Affordable Learning Georgia Grants Collections are intended to provide faculty with the frameworks to quickly implement or revise the same materials as a Textbook Transformation Grants team, along with the aims and lessons learned from project teams during the implementation process.

Each collection contains the following materials:

- Linked Syllabus
  - The syllabus should provide the framework for both direct implementation of the grant team's selected and created materials and the adaptation/transformation of these materials.
- Initial Proposal
  - The initial proposal describes the grant project's aims in detail.
- Final Report
  - The final report describes the outcomes of the project and any lessons learned.

Initial Proposal

Application Details

Manage Application: ALG Textbook Transformation Grants

Award Cycle:	Round 6
Internal Submission Deadline:	Monday, August 1, 2016

Application Title:	241
Application ID:	#001134
Submitter First Name:	Sara
Submitter Last Name:	Selby
Submitter Title:	Professor of English and Academic Affairs Projects Specialist
Submitter Email Address:	sara.selby@sgsc.edu
Submitter Phone Number:	912-449-7576
Submitter Campus Role:	Proposal Investigator (Primary or additional)
Applicant First Name:	Molly
Applicant Last Name:	Smith
Co-Applicant Name(s):	Sara Selby
Applicant Email Address:	molly.smith@sgsc.edu
Applicant Phone Number:	912-449-7578
Primary Appointment Title:	Professor of Biology
Institution Name(s):	South Georgia State College
Submission Date:	Monday, August 1, 2016

Team Members (Name, Title, Department, Institutions if different, and email address for each):

Dr. Molly E. Smith, Professor of Biology, School of Sciences, molly.smith@sgsc.edu
Sara Selby, Professor of English and Academic Affairs Projects Specialist, Academic Affairs, sara.selby@sgsc.edu

Sponsor, (Name, Title, Department, Institution):

Dr. Charles Johnson, Dean, School of Science, South Georgia State College

Proposal Title: 241

Course Names, Course Numbers and Semesters Offered:

Microbiology, BIOL 2215K, offered every semester

Final Semester of Instruction:	Fall 2017
Average Number of Students per Course Section:	24
Number of Course Sections Affected by Implementation in Academic Year:	2 (or 3 if summer is included)
Total Number of Students Affected by Implementation in Academic Year:	48 (or 72 if summer is included)
List the original course materials for students (including title, whether optional or required, & cost for each item):	Microbiology w/ Diseases by Body System by Bauman, required, $228.00Microbiology Lab Manual by Sundrum, required, $79.80
Proposal Category:	Specific Top 100 Undergraduate Courses
Requested Amount of Funding:	$10,800
Original per Student Cost:	$307.80
Post-Proposal Projected Student Cost:	$0
Projected Per Student Savings:	$307.80
Projected Total Annual Student Savings:	$14,774.40 (or $22,161.60 if Summer semester is included) This projection includes just one campus of SGSC; if both campuses were to adopt the open text, the projection would be doubled.

Creation and Hosting Platforms Used ("n/a" if none):

OpenStax CNX, iBooks Author, Merlot, Curriki

Project Goals:

Reduce costs for students pursuing degrees in allied health fields

Remix the open text to increase the likelihood of success for students in allied health fields

Create laboratory materials specifically geared towards allied health students
Incorporate more active learning strategies to facilitate student engagement
Transform course from face-to-face format to blended delivery

Statement of Transformation:

Traditional microbiology texts are typically too rigorous and massive for students in allied health fields, particularly for a one-semester course offering. Instructors generally end up rewriting the text or using only a fraction of the chapters offered. This project centers on the remixing of the new OpenStax Microbiology text to make it more suitable for students in allied health fields. The resulting remixed text will be titled Microbiology for Allied Health Students. Laboratory materials specifically designed to meet the needs of allied health programs will be created and packaged as a stand-alone open resource lab manual. A variety of active learning strategies will be developed and compiled as teaching tips for instructors. Transforming the course from a face-to-face delivery to a blended one is expected to increase enrollment; the current class size is constrained by lab space, and each semester the class enrollment reaches its maximum early in the registration period. A blended format with multiple lab sections to accompany it will extend the enrollment possibilities.

Allied health students, including but not limited to students in nursing, physician assistant, dental, and physical therapy programs, as well as instructors will be affected by this transformation. The institution will also be affected by the promise of increased enrollment, and, by extension, the entire USG will be affected.

While the obvious impact for students is economical, it is expected that the resulting textbook will be more readable, more palatable, and more usable for those in the allied health programs. Many, if not most, of these students enter their programs with no science prerequisites, and advanced texts make already challenging courses that much more difficult. When students must await financial aid disbursement to purchase textbooks or when they purchase the wrong edition of the book from online vendors, they begin the semester at a disadvantage, and this project will eliminate that disadvantage. Instructors of these courses will have a streamlined text without the superfluous technical information that makes traditional texts less than ideal for these programs. Remixing of the text so that only the concepts and information necessary for allied health programs are included should increase the likelihood of student success.

Microbiology is a course necessary for advancement in all allied health programs, and students at this institution (and most other USG institutions) must complete the course with a grade of C or better. A high proportion of the students enrolling in these programs are non-traditional students trying to work full-time while attending college. Currently, the course carries a high attrition rate, largely because students become overwhelmed with the volume and rigor

of the information included in the traditional textbook and withdraw before even attempting the first assessment. Often, job schedules change, also causing students to withdraw. A tailor-made, free, accessible textbook, available from Day 1 of the semester, might decrease the attrition rate, as might a blended delivery. Because this institution is an access institution, students seeking admission to the associate of science in nursing program comprise the primary enrollment in the current microbiology course, so a course tailored to their needs would be of great interest to them. Some of those students plan ultimately to pursue our newly developed BSN degree. Increased enrollment and success in microbiology will benefit the nursing programs, which are among the strongest programs of study here. Microbiology has never been offered online or in a blended format at this institution; the transformed delivery will help to meet the growing demand. A bachelor of science in biological sciences program was recently added, so as enrollment in that program grows, a separate microbiology course for that cadre of students will likely develop; thus, this transformation will help the department/school to plan strategically for the future.

Transformation Action Plan:

Having already used an OpenStax textbook in an Introductory Biology course, the Primary Investigator had already determined to use the new OpenStax Microbiology textbook upon availability (which will be Fall 2016). She also served as a reviewer of the text, which is what led her to see the need for a remixing of the text for allied health students. For some time, she has planned to create her own lab manual and to revise the course for blended delivery but has never had the support or been trained to do so. This project will provide the perfect opportunity to proceed.

In order to assure student engagement with the open text, the course will be redesigned to include a variety of active learning strategies. The blended delivery will be designed in accordance with Quality Matters standards and best practices. As is true with any new text adoption or course redesign, the syllabus will be revised to align with the content and delivery format.

As the Primary Investigator, instructor of record, and subject matter expert, Dr. Molly Smith is responsible for identifying the content to be included in the course modules and remixed textbook. She is also responsible for creating the lab experiments, revising the syllabus, incorporating active learning strategies into the course, and building modules for blended delivery. As distance education trainer, researcher, and editor, Sara Selby is responsible for training for blended delivery, researching and recommending active learning strategies, and for editing, formatting, and publishing all compilations. She will also ensure compliance with copyright and accessibility requirements, and she will complete and submit IRB proposals for the administration and analysis of quantitative and qualitative measures of success.

The remixed textbook will be available through OpenStax CNX. All original materials produced (lab manual and teaching tips) will be published in eBook format as well as PDF format and will be openly available from the iBooks Store and the Curriki repository. They will be indexed

through Merlot II. The blended course will be delivered via the institutional LMS (which is currently D2L/Brightspace).

Quantitative & Qualitative Measures:	Quantitative measures of success will include comparisons of Student Learning Outcomes (SLOs) success and DFW delta rates between previous sections of the course taught by the same professor using the traditional text and delivery and sections of the course using the OpenStax text and new lab manual and blended delivery. Particular attention will be paid to the attrition rate with the new materials and format. Qualitative measures will include surveys of student experience and satisfaction administered at the beginning and end of the course as well as mid-semester interviews. Student feedback will not be shared with the instructor of record until after the course is finished and final grades are officially recorded.

Timeline:

Because of the very ambitious four-pronged approach proposed for the transformation of this microbiology course, it is unlikely that the redesign will be completed in just one semester, so we are aiming to offer the redesigned course in Fall 2017.

September 2016: Determine what content modules will be created for online delivery. Begin review of OpenStax text to determine what material will be included in the remixed text to support those modules.

October 2016: Begin the process of building modules and remixing the text.

November 2016: Redesign the course syllabus and calendar to reflect the new delivery format and remixed text.

December 2016: Complete remixing of first draft of textbook and creation of at least half of the content modules; submit first status report.

January 2017: Begin compilation of lab manual and active learning strategies for face-to-face component of course.

February 2017: Design survey instruments to be used for qualitative assessment and begin IRB process; make final revisions to remixed textbook.

March 2017: Complete creation of content modules and compilation of lab manual; openly

publish final draft of remixed text in OpenStax CNX.

April 2017: Complete compilation of active learning strategies as teaching tips.

May 2017: Submit second status report.

June 2017: Offer redesigned course during Summer semester as a pilot with content modules and lab manual delivered via D2L/Brightspace.

July 2017: Make any revisions to materials necessary as indicated by pilot assessments; openly publish lab manual in Curriki and iBooks Store.

August 2017: Submit third status report; offer redesigned blended course during Fall 2107 semester.

September 2017: Administer first qualitative assessment.

October 2017: Conduct mid-semester interviews.

November 2017: Conduct final qualitative assessment; openly publish teaching tips in Curriki and iBooks Store and index everything through Merlot II.

December 2017: Gather and analyze qualitative and quantitative assessment data and submit final report.

Budget:

Additional salary for Dr. Molly Smith, Proposal Investigator (Primary): $5000.00*
Additional salaray for Sara Selby, Proposal Investigator (Additional): $5000.00*
Projected expenses (travel, incidentals, professional development, etc.): $800.00

*South Georgia State College does not employ instructional designers, nor do we have a functional Teaching and Learning Center. All work done for this project will be done by the proposal investigators on their own time in addition to their regular responsibilities and obligations to the institution.

Sustainability Plan:

Microbiology is offered every semester and will continue to be offered every semester at SGSC. Once the course redesign is complete, any instructor (at our institution or throughout the USG) can make use of the materials and techniques developed. Dr. Smith and Ms. Selby will maintain and update the course materials as necessary.

South Georgia State College
Division of Natural Sciences, Mathematics and Physical Education
www.sgsc.edu

To: Affordable Learning Georgia Textbook Transformation Grants Committee

Subject: Letter of support for Dr. Smith and Ms. Selby

From: Dr. Charles Johnson, Dean, School of Sciences

I want to express my support of the grant proposal to extend OpenStax textbooks to microbiology for students in allied health programs. This proposal is built upon the success both authors have had redesigning the Introductory Biology I class. The Project goals are as follows:

- Reduce costs for students pursuing degrees in allied health fields;
- Remix the open text to increase the likelihood of success for students in allied health fields;
- Create laboratory materials specifically geared towards allied health students;
- Incorporate more active learning strategies to facilitate student engagement;
- Transform course from face-to-face format to blended delivery.

These goals match the goals (from SGSC's master plan) to implement an enrollment improvement plan focused on recruitment, retention, and student success, and to develop academic program options to meet student and community needs.

As can be seen from the proposal; the microbiology course impacts a large number of the students at SGSC since all nursing student have to take the class. This proposal will lower the cost of college for students and contribute to their retention, progression, and graduation (ALG goal number 3) at SGSC.

Microbiology is offered every semester and will continue to be offered every semester at SGSC, so the project's sustainability is guaranteed. Dr. Smith and Ms. Selby have committed to maintaining and updating the course materials as necessary. In the future, this project will be rolled out to the other campuses for adoption. The School of Sciences supports this project and will benefit from the work of Dr. Smith and Ms. Selby.

Affordable Learning Georgia Textbook Transformation Grants

Rounds Six, Seven, and Eight

For Implementations beginning Fall Semester 2016

Running Through Fall Semester 2017

Proposal Form and Narrative

Submitter Name	Sara Selby
Submitter Title	Academic Affairs Projects Specialist and Professor of English
Submitter Email	sara.selby@sgsc.edu
Submitter Phone Number	912-449-7576
Submitter Campus Role	Proposal Investigator (Additional)
Applicant Name	Dr. Molly Smith
Applicant Email	molly.smith@sgsc.edu
Applicant Phone Number	912-449-7578
Primary Appointment Title	Professor of Biology
Institution Name(s)	South Georgia State College

Team Members	Dr. Molly E. Smith, Professor of Biology, molly.smith@sgsc.edu Sara Selby, Professor of English and Academic Affairs Projects Specialist, sara.selby@sgsc.edu				
Sponsor, Title, Department, Institution	Dr. Charles Johnson, Dean, School of Science				
Proposal Title	Microbiology for Students in Allied Health Programs				
Course Names, Course Numbers and Semesters Offered	Microbiology, BIOL 2215K, offered every semester				
Final Semester of Instruction	Fall 2017				
Average Number of Students Per Course Section	24	**Number of Course Sections Affected by Implementation in Academic Year**	**2**	**Total Number of Students Affected by Implementation in Academic Year**	48
Award Category (pick one)	☐ No-Cost-to-Students Learning Materials ☐ OpenStax Textbooks ☐ Specific Top 50 Lower Division Courses				
List the original course materials for students (including title, whether optional or required, & cost for each	***Microbiology w/ Diseases by Body System*** by Bauman, required, $228.00 ***Microbiology Lab Manual*** by Sundrum, required, $79.80				

item)	
Requested Amount of Funding	$10,800.00
Original Per Student Cost	$307.80
Post-Proposal Projected Per Student Cost	$0
Projected Per Student Savings	$307.80
Projected Total Annual Student Savings	$14,774.40 (or $22,161.60 if Summer semester is included) This projection includes just one campus of SGSC; if both campuses were to adopt the open text, the projection would be doubled.
Creation and Hosting Platforms Used	OpenStax CNX, iBooks Author, Merlot, Curriki

NARRATIVE

1.1 PROJECT GOALS

- Reduce costs for students pursuing degrees in allied health fields
- Remix the open text to increase the likelihood of success for students in allied health fields
- Create laboratory materials specifically geared towards allied health students
- Incorporate more active learning strategies to facilitate student engagement
- Transform course from face-to-face format to blended delivery

1.2 STATEMENT OF TRANSFORMATION

Traditional microbiology texts are typically too rigorous and massive for students in allied health fields, particularly for a one-semester course offering. Instructors generally end up rewriting the text or using only a fraction of the chapters offered. This project centers on the remixing of the new OpenStax Microbiology text to make it more suitable for students in allied health fields. The resulting remixed text will be titled *Microbiology for Allied Health Students*. Laboratory materials specifically designed to meet the needs of allied health programs will be created and packaged as a stand-alone open resource lab manual. A variety of active learning strategies will be developed and compiled as teaching tips for instructors. Transforming the course from a face-to-face delivery to a blended one is expected to increase enrollment; the current class size is constrained by lab space, and each semester the class enrollment reaches its maximum early in the registration period. A blended format with multiple lab sections to accompany it will extend the enrollment possibilities.

Allied health students, including but not limited to students in nursing, physician assistant, dental, and physical therapy programs, as well as instructors will be affected by this transformation. The institution will also be affected by the promise of increased enrollment, and, by extension, the entire USG will be affected.

While the obvious impact for students is economical, it is expected that the resulting textbook will be more readable, more palatable, and more usable for those in the allied health programs. Many, if not most, of these students enter their programs with no science prerequisites, and advanced texts make already challenging courses that much more difficult. When students must await financial aid disbursement to purchase textbooks or when they purchase the wrong edition of the book from online vendors, they begin the semester at a disadvantage, and this project will eliminate that disadvantage. Instructors of these courses will have a streamlined text without the superfluous technical information that makes traditional texts less than ideal for these programs. Remixing of the text so that only the concepts and information necessary for allied health programs are included should increase the likelihood of student success.

Microbiology is a course necessary for advancement in all allied health programs, and students at this institution (and most other USG institutions) must complete the course with a grade of C or better. A high proportion of the students enrolling in these programs are non-traditional students trying to work full-time while attending college. Currently, the course carries a high attrition rate, largely because students become overwhelmed with the volume and rigor of the information included in the traditional textbook and withdraw before even attempting the first assessment. Often, job schedules change, also causing students to withdraw. A tailor-made, free, accessible textbook, available from Day 1 of the semester, might decrease the attrition rate, as might a blended delivery. Because this institution is an access institution, students seeking admission to the associate of science in nursing program comprise the primary enrollment in

the current microbiology course, so a course tailored to their needs would be of great interest to them. Some of those students plan ultimately to pursue our newly developed BSN degree. Increased enrollment and success in microbiology will benefit the nursing programs, which are among the strongest programs of study here. Microbiology has never been offered online or in a blended format at this institution; the transformed delivery will help to meet the growing demand. A bachelor of science in biological sciences program was recently added, so as enrollment in that program grows, a separate microbiology course for that cadre of students will likely develop; thus, this transformation will help the department/school to plan strategically for the future.

1.3 TRANSFORMATION ACTION PLAN

Having already used an OpenStax textbook in an Introductory Biology course, the Primary Investigator had already determined to use the new OpenStax Microbiology textbook upon availability (which will be Fall 2016). She also served as a reviewer of the text, which is what led her to see the need for a remixing of the text for allied health students. For some time, she has planned to create her own lab manual and to revise the course for blended delivery but has never had the support or been trained to do so. This project will provide the perfect opportunity to proceed.

In order to assure student engagement with the open text, the course will be redesigned to include a variety of active learning strategies. The blended delivery will be designed in accordance with Quality Matters standards and best practices. As is true with any new text adoption or course redesign, the syllabus will be revised to align with the content and delivery format.

As the Primary Investigator, instructor of record, and subject matter expert, Dr. Molly Smith is responsible for identifying the content to be included in the course modules and remixed textbook. She is also responsible for creating the lab experiments, revising the syllabus, incorporating active learning strategies into the course, and building modules for blended delivery. As distance education trainer, researcher, and editor, Sara Selby is responsible for training for blended delivery, researching and recommending active learning strategies, and for editing, formatting, and publishing all compilations. She will also ensure compliance with copyright and accessibility requirements, and she will complete and submit IRB proposals for the administration and analysis of quantitative and qualitative measures of success.

The remixed textbook will be available through OpenStax CNX. All original materials produced (lab manual and teaching tips) will be published in eBook format as well as PDF format and will be openly available from the iBooks Store and the Curriki repository. They will be indexed through Merlot II. The blended course will be delivered via the institutional LMS (which is currently D2L/Brightspace).

1.4 QUANTITATIVE AND QUALITATIVE MEASURES

Quantitative measures of success will include comparisons of Student Learning Outcomes (SLOs) success and DFW delta rates between previous sections of the course taught by the same professor using the traditional text and delivery and sections of the course using the OpenStax text and new lab manual and blended delivery. Particular attention will be paid to the attrition rate with the new materials and format.

Qualitative measures will include surveys of student experience and satisfaction administered at the beginning and end of the course as well as mid-semester interviews. Student feedback will not be shared with the instructor of record until after the course is finished and final grades are officially recorded.

1.5 TIMELINE

Because of the very ambitious four-pronged approach proposed for the transformation of this microbiology course, it is unlikely that the redesign will be completed in just one semester, so we are aiming to offer the redesigned course in Fall 2017.

September 2016: Determine what content modules will be created for online delivery. Begin review of OpenStax text to determine what material will be included in the remixed text to support those modules.

October 2016: Begin the process of building modules and remixing the text.

November 2016: Redesign the course syllabus and calendar to reflect the new delivery format and remixed text.

December 2016: Complete remixing of first draft of textbook and creation of at least half of the content modules; submit first status report.

January 2017: Begin compilation of lab manual and active learning strategies for face-to-face component of course.

February 2017: Design survey instruments to be used for qualitative assessment and begin IRB process; make final revisions to remixed textbook.

March 2017: Complete creation of content modules and compilation of lab manual; openly publish final draft of remixed text in OpenStax CNX.

April 2017: Complete compilation of active learning strategies as teaching tips.

May 2017: Submit second status report.

June 2017: Offer redesigned course during Summer semester as a pilot with content modules and lab manual delivered via D2L/Brightspace.

July 2017: Make any revisions to materials necessary as indicated by pilot assessments; openly publish lab manual in Curriki and iBooks Store.

August 2017: Submit third status report; offer redesigned blended course during Fall 2107 semester.

September 2017: Administer first qualitative assessment.

October 2017: Conduct mid-semester interviews.

November 2017: Conduct final qualitative assessment; openly publish teaching tips in Curriki and iBooks Store and index everything through Merlot II.

December 2017: Gather and analyze qualitative and quantitative assessment

data and submit final report.

1.6 BUDGET

Additional salary for Dr. Molly Smith, Proposal Investigator (Primary): $5000.00*

Additional salaray for Sara Selby, Proposal Investigator (Additional): $5000.00*

Projected expenses (travel, incidentals, professional development, etc.): $800.00

*South Georgia State College does not employ instructional designers, nor do we have a functional Teaching and Learning Center. All work done for this project will be done by the proposal investigators on their own time in addition to their regular responsibilities and obligations to the institution.

1.7 SUSTAINABILITY PLAN

Microbiology is offered every semester and will continue to be offered every semester at SGSC. Once the course redesign is complete, any instructor (at our institution or throughout the USG) can make use of the materials and techniques developed. Dr. Smith and Ms. Selby will maintain and update the course materials as necessary.

1.8 REFERENCES & ATTACHMENTS

See attached letter from Dr. Charles Johnson.

Syllabus

Microbiology for Allied Health Students Course Outline

Student Learning Outcomes:

Students will compare and contrast the various pathogenic microorganisms based on their morphology and other biological characteristics.

Students will outline the various mechanisms by which pathogens disrupt homeostasis.

Students will articulate and diagram the various responses of the human body to infection and apply this understanding to the infectious disease process.

Students will evaluate the various methods of controlling microorganisms including the prevention and treatment of infectious disease.

Students will distinguish infectious diseases based on causative agents, characteristic signs and symptoms, treatment and prevention.

Students will demonstrate laboratory skills and techniques related to the isolation, staining, assessment of metabolism and identification of microorganisms.

Week	Topic	Link
1	Class: Introduction to Microbiology Lab: Safety	Smith & Selby, *Microbiology for Allied Health Students* (CC BY 4.0), Chapter 1: An Invisible World https://oer.galileo.usg.edu/biology-textbooks/15/ Smith & Selby, *Microbiology for Allied Health Students Lab Manual* (CC BY 4.0), 4: Appendix: Laboratory Safety Contract https://oer.galileo.usg.edu/biology-textbooks/16/
2	Class: Prokaryotic Cell Structure and Function Lab: Microscopy	Smith & Selby, *Microbiology for Allied Health Students* (CC BY 4.0), Chapter 2: The Cell https://oer.galileo.usg.edu/biology-textbooks/15/ Smith & Selby, *Microbiology for Allied Health Students Lab Manual* (CC BY 4.0), 1: Microscopy & Staining https://oer.galileo.usg.edu/biology-textbooks/16/
3	Class: Eukaryotic Pathogens	Smith & Selby, *Microbiology for Allied Health Students* (CC BY 4.0), Chapter 3: The Eukaryotes of Microbiology

		https://oer.galileo.usg.edu/biology-textbooks/15/
	Lab Gram Stain	Smith & Selby, *Microbiology for Allied Health Students Lab Manual* (CC BY 4.0), 2-1: Gram Stain Procedure https://oer.galileo.usg.edu/biology-textbooks/16/
4	Class: Acellular Pathogens	Smith & Selby, *Microbiology for Allied Health Students* (CC BY 4.0), Chapter 4: Acellular Pathogens https://oer.galileo.usg.edu/biology-textbooks/15/
	Lab: Endospore and Acid-fast Stains	Smith & Selby, *Microbiology for Allied Health Students Lab Manual* (CC BY 4.0), 2-2: Endospore Stain Procedure & 2-3: Acid-Fast Stain Procedure https://oer.galileo.usg.edu/biology-textbooks/16/
5	Class: Mechanisms of Pathogenesis	Smith & Selby, *Microbiology for Allied Health Students* (CC BY 4.0), Chapter 5: Microbial Mechanisms of Pathogenicity https://oer.galileo.usg.edu/biology-textbooks/15/
	Lab: Carbohydrate Fermentation Starch Agar Gelatin Agar Catalase Motility Agar SIM Agar	Smith & Selby, *Microbiology for Allied Health Students Lab Manual* (CC BY 4.0), 3-1: Carbohydrate Fermentation; 3-2: Starch Agar; 3-3: Gelatin Agar; 3-4: Catalase; 3-5: Motility Agar; 3-6: SIM Agar https://oer.galileo.usg.edu/biology-textbooks/16/
6	Class: Innate Nonspecific Host Defenses	Smith & Selby, *Microbiology for Allied Health Students* (CC BY 4.0), Chapter 6: Innate Nonspecific Host Defenses https://oer.galileo.usg.edu/biology-textbooks/15/
	Lab: Tryptone Broth MR-VP Broth Simmons Citrate Agar	Smith & Selby, *Microbiology for Allied Health Students Lab Manual* (CC BY 4.0), 3-7: Tryptone Broth; 3-8: MR-VP Broth; 3-9: Simmons Citrate Agar https://oer.galileo.usg.edu/biology-textbooks/16/
7	Class: Exam 1	
	Lab: Urea Broth Phenylalanine Agar TSI Agar EMB Agar	Smith & Selby, *Microbiology for Allied Health Students Lab Manual* (CC BY 4.0), 3-10: Urea Broth; 3-11: Phenylalanine Agar; 3-12: Triple-Sugar Iron Agar; 3-13: Levine EMB Agar https://oer.galileo.usg.edu/biology-textbooks/16/

8	Class: Adaptive Specific Host Defenses Lab: Wrap-up; Using Flow Charts	Smith & Selby, *Microbiology for Allied Health Students* (CC BY 4.0), Chapter 7: Adaptive Specific Host Defenses https://oer.galileo.usg.edu/biology-textbooks/15/
9	Class: Diseases of the Immune System Lab: Unknowns	Smith & Selby, *Microbiology for Allied Health Students* (CC BY 4.0), Chapter 8: Diseases of the Immune System https://oer.galileo.usg.edu/biology-textbooks/15/ Smith & Selby, *Microbiology for Allied Health Students Lab Manual* (CC BY 4.0), https://oer.galileo.usg.edu/biology-textbooks/16/
10	Class: Control of Microorganisms Lab: Unknowns	Smith & Selby, *Microbiology for Allied Health Students* (CC BY 4.0), Chapter 9: Control of Microbial Growth https://oer.galileo.usg.edu/biology-textbooks/15/ Smith & Selby, *Microbiology for Allied Health Students Lab Manual* (CC BY 4.0), https://oer.galileo.usg.edu/biology-textbooks/16/
11	Class: Antimicrobial Drugs Lab: Unknowns	Smith & Selby, *Microbiology for Allied Health Students* (CC BY 4.0), Chapter 10: Antimicrobial Drugs https://oer.galileo.usg.edu/biology-textbooks/15/ Smith & Selby, *Microbiology for Allied Health Students Lab Manual* (CC BY 4.0), https://oer.galileo.usg.edu/biology-textbooks/16/
12	Class: Epidemiology Lab: Unknowns	Smith & Selby, *Microbiology for Allied Health Students* (CC BY 4.0), Chapter 11: Disease and Epidemiology https://oer.galileo.usg.edu/biology-textbooks/15/ Smith & Selby, *Microbiology for Allied Health Students Lab Manual* (CC BY 4.0), https://oer.galileo.usg.edu/biology-textbooks/16/
13	Class: Exam 2 Lab: Unknowns	 Smith & Selby, *Microbiology for Allied Health Students Lab Manual* (CC BY 4.0), https://oer.galileo.usg.edu/biology-textbooks/16/

14	Class: Skin and Eye Infections Respiratory System Infections Lab: Unknowns	Smith & Selby, *Microbiology for Allied Health Students* (CC BY 4.0), Chapter 12: Skin and Eye Infections and Chapter 13: Respiratory System Infections https://oer.galileo.usg.edu/biology-textbooks/15/ Smith & Selby, *Microbiology for Allied Health Students Lab Manual* (CC BY 4.0), https://oer.galileo.usg.edu/biology-textbooks/16/
15	Class: Urogenital System Infections Digestive System Infections Lab: Unknowns	Smith & Selby, *Microbiology for Allied Health Students* (CC BY 4.0), Chapter 14: Urogenital System Infections and Chapter 15: Digestive System Infections https://oer.galileo.usg.edu/biology-textbooks/15/ Smith & Selby, *Microbiology for Allied Health Students Lab Manual* (CC BY 4.0), https://oer.galileo.usg.edu/biology-textbooks/16/
16	Class: Circulatory and Lymph System Infections Nervous System Infections Lab: Laboratory Final Exam	Smith & Selby, *Microbiology for Allied Health Students* (CC BY 4.0), Chapter 16: Circulatory and Lymphatic System Infections and Chapter 17: Nervous System Infections https://oer.galileo.usg.edu/biology-textbooks/15/ Smith & Selby, *Microbiology for Allied Health Students Lab Manual* (CC BY 4.0), https://oer.galileo.usg.edu/biology-textbooks/16/
17	Final Exam	

Final Report

Affordable Learning Georgia Textbook Transformation Grants

Round 6, Project #241

Final Report

Date: 12/18/17

Grant Number: 241

Institution Name(s): South Georgia State College

Team Members (Name, Title, Department, Institutions if different, and email address for each): Molly Smith, Professor of Biology, School of Sciences, molly.smith@sgsc.edu

Sara Selby, Academic Affairs Projects Specialist, Academic Affairs, sara.selby@sgsc.edu

Project Lead: Molly Smith

Course Name(s) and Course Numbers: Microbiology, BIOL 2215K

Semester Project Began: Fall 2016

Semester(s) of Implementation: Fall 2017

Average Number of Students Per Course Section: 24

Number of Course Sections Affected by Implementation: 1

Total Number of Students Affected by Implementation: 22

1. Narrative

A. The goal of this project was to transform BIOL 2215K from a traditionally-delivered lecture-based course to a hybrid course using an OER and active learning strategies. The deliverables of the project were a remixed OpenStax textbook and a lab manual and ancillary materials created by the project team. Key outcomes were expected to be increased pass rates and increased completion rates, which have been achieved, as data presented later in this report will illustrate.

Because traditional Microbiology textbooks are very expensive and contain chapters not really pertinent to an allied health curriculum, we sought to reduce costs to students by choosing an OER. However, as a reviewer for the OpenStax *Microbiology* textbook, I realized that it still contained material that I choose not to cover in the course I teach primarily for nursing majors. A major goal of the project was to remix the OpenStax text to suit my needs; therein lay one of the major challenges as well. My team partner and I chose to use

the OpenStax CNX platform, which was ideal for eliminating unused chapters and reordering those we kept, even though it was extremely slow and sometimes totally unresponsive. It was not ideal for publishing our remixed text, because it required approval of the first submission prior to publishing, with no indication of how long that process might take, and we are still pending approval of our preface before we can submit the entire remixed text. With our deadline approaching, we ended up using PDF versions of the text (which I had previously downloaded to provide to students via our LMS), which did not allow for the customization that CNX affords. That was our major challenge, which we overcame by asking that our work be hosted via GALILEO Repository.

Our accomplishments included the creation of a lab manual with photographs of lab results and a collection of instructional materials. One of the most personally satisfying accomplishments was the transformation of the method of delivery of the course, from traditional lecture format to a blended/hybrid delivery. During the period of the grant, I completed an in-house online training course covering best practices in online course design and delivery, which was instrumental in my course redesign. My instruction was significantly transformed. My thinking about the class changed from 'what will I be doing in class this week to give my students knowledge' to 'what will my students be doing in class this week to show me that they have an understanding of the material?' I was forced to rethink my usual methods of assessment of student learning, which moved away from major exams to classroom activities (group or single) and pre-class quizzes in the LMS. This project reinvigorated my teaching by forcing me to think about new and engaging ways to assess learning.

Students were surveyed early in the semester and late in the semester about their opinions of the OER textbook, course design, functionality of the LMS, and relevance of classroom activities. Responses were overwhelmingly positive (which will be discussed later), so, in addition to improved pass rates, student satisfaction has improved.

As for lessons learned, I discovered early on that students need a better awareness of what a hybrid course requires of them. It does not mean that they need to devote only one day a week rather than two or three to the course materials. It also does not mean that I will rehash what I expected them to cover on their own outside of the classroom. They were sometimes surprised to realize that they had to learn that brief explanations of the material would occur when necessary, but for the most part, I would move right into some type of assessment activity in class. After a few weeks, they realized the importance of attending class and preparing for class meetings. I realized that I need to make it clear very early on that even if the class meets only once a week, they should engage with the material much more than once a week.

2. Quotes

- "I was (and continue to be) very satisfied with the book!"
- "I like the fact that you can access the book on [a] computer or phone and do not have to carry it around always with you."
- "I like the fact that it's available free of charge."

3. Quantitative and Qualitative Measures

3a. Overall Measurements

Student Opinion of Materials

Was the overall student opinion about the materials used in the course positive, neutral, or negative?

Total number of students affected in this project: ___22_____

- Positive: __89.48_____ % of ___19_____ number of respondents
- Neutral: __5.26_____ % of ___19_____ number of respondents
- Negative: __5.26_____ % of __19_____ number of respondents

Student Learning Outcomes and Grades

Was the overall comparative impact on student performance in terms of learning outcomes and grades in the semester(s) of implementation over previous semesters positive, neutral, or negative?

Choose One:

- _x__ Positive: Higher performance outcomes measured over previous semester(s)
- ___ Neutral: Same performance outcomes over previous semester(s)
- ___ Negative: Lower performance outcomes over previous semester(s)

Student Drop/Fail/Withdraw (DFW) Rates

Was the overall comparative impact on Drop/Fail/Withdraw (DFW) rates in the semester(s) of implementation over previous semesters positive, neutral, or negative?

Drop/Fail/Withdraw Rate:

___9____% of students, out of a total __22_____ students affected, dropped/failed/withdrew from the course in the final semester of implementation.

Choose One:

- _x__ Positive: This is a lower percentage of students with D/F/W than previous semester(s)
- ___ Neutral: This is the same percentage of students with D/F/W than previous semester(s)
- ___ Negative: This is a higher percentage of students with D/F/W than previous semester(s)

3b. Narrative

The three semesters chosen for comparison data prior to using the OpenStax OER textbook were Fall 2015, Spring 2016, and Summer 2016. During these semesters, the delivery method was lecture and the text used was the traditional one by Robert W. Bauman (Pearson Publishing). DFW rates for each semester were as follows: Fall 2015: 44%, Spring 2016: 56% and Summer 2016: 13% for an average of 38% for all three semesters. Complete comparison DFW-rate data is provided in the supporting data file.

The OpenStax text was not officially published until November 2016, but because it had initially been announced as being available in the fall, I had planned to use it for the fall semester. As the beginning of the semester came and the book was still not available, I reached out to the OpenStax representative, who sent me chapters in advance of publication, which I uploaded to the institution's learning management system and used as the course textbook. I also began to experiment with some of the active learning techniques that I intended to use during the semester of implementation. As one can see from the data in the supporting data file, DFW rates started to decrease at that point.

In the three semesters prior to the use of the OER and course redesign, the average DFW rate was 38%. In Fall 2017, the semester of implementation, in a class of 22 students, the DFW rate was 9% (both were withdrawals). This represents a decrease of 29% over the average of the three previous semesters. Average course completion rate (ABC) over those same semesters was 62%, while the completion rate was 91% for the semester of implementation, an increase of 29%. Complete comparison data is provided in the supporting data file.

Student learning outcomes measures are reported on a cyclical basis at South Georgia State College, and microbiology has not been included in any cycle since the consolidation of Waycross College and South Georgia College in 2013; therefore, no comparative data is available. Although GPAs were not obtained for each student this semester, we feel confident in reporting that most were 2.8 or above since that is the minimum required to be admitted into the Nursing program at our institution; admission to the Nursing program is the goal of the majority of students taking this course.

During the semester of implementation, students were surveyed near the beginning of the course about their use and initial impressions of the textbook; 85% of those completing the survey responded favorably. Complete survey data for the initial survey can be found at https://www.surveymonkey.com/results/SM-LKD6DY6R8/. Students were surveyed again near the end of the semester about their opinions of the textbook, learning materials, teaching methods, and features of the LMS. An overwhelming percentage of respondents (78%+) were either satisfied or highly satisfied with each of the parameters surveyed. Complete survey data for the exit survey can be found at https://www.surveymonkey.com/results/SM-69HY796R8/.

Several students expressed throughout the semester how glad they were that the course was delivered in a hybrid format because it allowed them to continue to work and attend classes. Comments from both surveys include:

- "The hybrid course is excellent. Class one day per week is a life saver for me because I work full time and I have three children. Great for the more mature and focused student."
- "[The class activities] maintained the level of accountability and challenge, and also encouraged student participation both individually and collectively."
- "I learned a great deal from this course and the activities were reinforcement."

One factor that could have had an impact on course outcomes was Hurricane Irma, which caused classes to be cancelled for a week. However, because the class was delivered in a hybrid format, this probably did not have as much of an impact as it would have had on a class meeting twice a week. Students were able (and encouraged) to keep up with the work via the LMS. In fact, we were able to keep up so well that when the institution scheduled make-up days, we used that time as review time because we had nothing to make up.

4. Sustainability Plan

Materials created as part of this project will be hosted on the OpenStax CNX site (when approved) and in the GALILEO Repository and will be indexed through Merlot II. Updates to the text will be made (both project team members have shared access in CNX) as needed or upon the release of a new edition of the OpenStax text. Any updates to materials in the LMS (textbook links, lab manual text, etc.) will be done by Dr. Smith on a regular basis.

5. Future Plans

I have already adopted the OpenStax text *Concepts of Biology* and developed materials for the Introductory Biology sequence that I teach. However, I am always searching for open material to enhance learning and keep things 'fresh' for my students and for me. The microbiology course was the remaining course that I teach that could benefit from a transformation. Now, all that remains is routine tweaking of the courses with new/different methods of assessment and activities.

Both members of the project team are currently working on a proposal for a presentation at the USG Teaching and Learning Conference.

6. Description of Photograph

(left-right) Sara Selby, editor and photographer; Dr. Molly Smith, project lead, subject matter expert, author, and instructor of record.